

## **Piezoelectric Data Entry Devices**

### ***ABSTRACT OF THE DISCLOSURE***

5 A piezoelectric transducer is provided, in which a piezoelectric cylindrical shell has  
conductive layers on the outside and inside of the shell, which are adapted to be  
connected to a signal input source. When the conductive layers are activated by  
10 the signal input source, the piezoelectric layer resonates to produce an output  
signal waveform, typically having a characteristic sound pressure level, from the  
shell structure. Alternative embodiments include a flat piezoelectric layer with  
opposing conductive layers, which is then formed into a shell structure. In a  
preferred embodiment, an inner spool is located within the shell structure, which  
15 supports and maintains the circular cross-sectional profile of the piezoelectric  
cylindrical transducer, to insure radial transmission of the output signal. To increase  
the sound pressure level, the inner spool preferably includes a recessed area,  
which defines a void between the inner conductive layer on the shell and the  
recessed area. The void acts to increase the characteristic output sound pressure  
20 level for the transducer. In marking and erasing implement embodiments, one or  
more piezoelectric transducers are located on a data entry device, and are either  
used alone, or in conjunction with second output transmitters, such as infrared  
transmitters, to transmit repeated signals from the data entry device to a receiver,  
which can be used to accurately determine the location of the pointing tip of the  
data entry device, in relation to an electronic tablet or white board.